

REMARKS

Reconsideration and allowance of the above-referenced application are respectfully requested. The foregoing amendments are responsive to the March 15, 2001 Office Action. Applicants respectfully request entry of the requested amendments and reconsideration of the application in view of the following comments.

Response to the Drawing Objections

The drawings are objected to under 37 C.F.R. § 1.83(a) for allegedly not showing every feature of the claims. With regard to Claim 1, the claim is amended to recite only an external structure, which is shown as the external structure 304 in Figure 3. For Claim 9, a plurality of conductive contacts and epoxy bonds are well known in the art and shown in Figure 1. Figure 3 shows a close-up view of one of these contacts/bonds having a corresponding insulating island according to Claim 9 as amended herein.

Response to objections under 35 U.S.C. § 112, second paragraph

Claims 1-8 and 13 stand rejected under 35 U.S.C. § 112, second paragraph as being indefinite. Applicants amend the claims herein to correct any indefiniteness and Applicants

respectfully submit that all claims now comply with the requirements of 35 U.S.C. § 112.

Response to the Claim Rejections Under 35 U.S.C § 103

Claims 1-4 and 7-13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,040,630 issued to Panchou, et al. The rejection asserts that Panchou allegedly teaches each element of the claims except for silver epoxy bonds, a photodetector, and an oxide containing island, which are allegedly well known in the art.

The present invention is directed toward a semiconductor interconnection system having an insulating island configured to prevent the migration of a metal element from the bond to the contact. As seen in Figure 3, this is accomplished by placing the insulating island 324 between the bond containing the metal element 316 and the contact 306. Thus, any metallic element migrating from the bond is stopped by the island.

None of the cited art teaches or suggests an island for preventing metallic migration. The rejection asserts that item 30 of Panchou is such an insulating island. However, item 30 is simply a thermoplastic attachment film and is not used to prevent migration of a metallic element. Specifically, Figure 4 of Panchou shows that the attachment film 30 has vias 34 for the

bond element 14 to pass through. This allows the bond 14 to make electrical contact with the bond pads 38. Thus, any metallic element in the bonds 14 are still free to pass to the bond pads 38. (See col. 5, lines 35-60). The thermoplastic attachment film does nothing to prevent such migration.

In view of the foregoing distinctions, Applicants respectfully submit that independent Claims 1 and 9 are patentably distinguished over the cited art. Applicants respectfully submit that Claims 1, and 9 are in condition for allowance, and Applicants respectfully request allowance of Claims 1 and 9.

Claims 2-4, 7-8, and 10-13 depend either directly or indirectly from one of the independent claims. Each dependent claim further defines the independent claim from which it depends. In view of the foregoing remarks regarding Claims 1 and 9, Applicants respectfully submit that Claims 2-4, 7-8, and 10-13 are likewise in condition for allowance. Applicants respectfully request allowance of dependent Claims 2-4, 7-8, and 10-13.

Allowable Subject Matter

Claims 5 and 6 are indicated to contain allowable subject matter if rewritten to overcome the rejections under 35 U.S.C. § 112. Applicant has amended Claim 1 to overcome the 35



U.S.C. § 112 rejection to Claims 5 and 6, and therefore Applicant respectfully requests allowance of Claims 5 and 6.


Summary

In view of the above amendments and remarks, all of the claims should be in condition for allowance. A formal notice to that effect is respectfully solicited.

Please apply any other charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

Date: 7/12/01

  
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**Version with markings to show changes made**

In the claims:

Claims 1, 9, and 13 have been amended as follows:

1. (Amended) A semiconductor interconnection system, comprising:

a semiconductor die;

first and second conductive contacts, said first conductive contact coupled to a surface of said semiconductor die, and said second conductive contact coupled to an external structure [or die];

a silver epoxy bond interposed between said first and second conductive contacts, said epoxy bond providing electrical and mechanical interconnection between said semiconductor die and said external structure; and

an insulating island configured to prevent migration of silver from said silver epoxy bond to said semiconductor die through said first conductive contact.

9. (Amended) A semiconductor flip-chip, comprising:  
a semiconductor die having a plurality of conductive contacts;

a plurality of epoxy bonds having a metallic component, said epoxy bonds configured to provide interconnection between said semiconductor die and an external structure, said plurality of epoxy bonds selectively applied to said plurality of conductive contacts on said semiconductor die and corresponding conductive contacts on the external structure; and

an [array of] insulating [islands] island corresponding to each of the plurality of epoxy bonds, each insulating island coupled to one of said plurality of conductive contacts, [said] each insulating [islands] island configured to prevent migration of said metallic substance from one of said plurality of epoxy bonds to said semiconductor die through said plurality of conductive contacts.

13. (Amended) The flip-chip of claim [11] 12, wherein said array of insulating islands prevents degradation of low reverse-bias leakage currents in said array of photodiode pixels.